

senate decided to accept the offer, to devote the whole of the 700*l.* a year as salary to the professor, and to set aside a further sum of 200*l.* a year to defray the cost of assistants and laboratory expenses in connection with the chair."

A DAY higher commercial department is to be opened at the end of September next in connection with the City of London College. The object of this department is to provide a higher education for those who have already had an ordinary secondary education. Hitherto there has been some basis for the charge that higher education has not generally induced students to regard business sympathetically, nor has it exhibited a commercial career attractively. Those engaged in higher education have seldom attempted to show that the study of science, language, and of other subjects is, or can be, related to the conduct of commerce, and that a commercial man will understand his business better if he starts with a groundwork of knowledge which has been deliberately exhibited to him in its relation to the conduct of ordinary business. Those responsible for the new scheme at the City of London College believe that, other things being equal, a youth who has been trained to see the principles which lie behind the facts of commerce, to know how far nature has been controlled by commerce, and commerce by nature; to know the commercial methods of his own and other nations and the reasons for their existence, will make a better business-man than one who has had no such training. They believe that there is a mass of experience a judicious selection from which, if assimilated, will save an English youth on his actual entry to commercial life from errors and waste of time. The experiment will be watched with great interest by all who are interested in the various sides of higher education.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 8.—"The Morphology of the Ungulate Placenta, particularly the Development of that Organ in the Sheep, and Notes upon the Placenta of the Elephant and Hyrax." By R. **Assheton**. Communicated by A. Sedgwick, F.R.S.

The formation of the placenta of the Ungulata vera is founded on a system of foldings of the subzonal membrane (or of the trophoblast only), which fit into corresponding grooves in the walls of the uterus, without thickening of the trophoblast layer of the blastocyst, and without destruction of maternal epithelium or other tissue (Sus). Certain parts of the crests of the ridges are produced by local amplification into true villi, into which the splanchnopleure of the allantois subsequently extends (Equus, Bos, &c.).

For this type of placentation, which is caused fundamentally by the folding of the trophoblast, the term plicate is used (placenta plicata), and to this type of placentation it is suggested that the Cetacea, Sirenia, and Proboscidea conform, as well as the Ungulata vera, and possibly the Edentata and Prosimia.

The term placenta cumolata is used for the type of placentation in which the placenta is formed by the heaping up or thickening of the trophoblast layer, among the cells of which accumulation extravasated maternal blood circulates. Destruction of the maternal epithelium probably always occurs. To this type belong the Rodentia, Insectivora, the Hyracoidea, Primates, and Chiroptera. The Carnivora are perhaps intermediate, but, according to Strahl's account, they would be distinctly plicate, while, according to the account of other authors, they are slightly cumulate.

The morphological position of the sheep's placenta, a full account of the development of which is given in the paper, is at that end of the series of plicate forms which closely approximates to the cumulate type.

The placentation of the Ungulata shows that that order is more closely connected with the Proboscidea, and the Sirenia and Carnivora, than with other groups of mammals, whilst the placentation of the Hyracoidea suggests no connection at all with those groups, but is of the cumulate type, and resembles more closely the form found in certain of the Insectivora.

EDINBURGH.

Royal Society, July 10.—Dr. R. H. Traquair in the chair.—On the bathymetry, deposits, and temperature of the south-western Pacific: Sir John **Murray**, K.C.B. The region discussed lay to the east and south-east of Australia. Seven of the soundings were in depths exceeding 4000 fathoms and three in depths exceeding 5000 fathoms. Interesting comparisons were made between the bathymetric charts and the temperature charts, and information was also derived from the study of more than 1000 samples of deposits. Globigerina ooze covered about 48 per cent., and red clay about 44 per cent. of the bottom, the remaining 8 per cent. being covered by other deposits. The percentage of carbonate of lime was low in very deep water and in shallow water near islands not bordered by coral reefs. In moderately deep water and in shallow water where the deposit was coral mud, the percentage of carbonate of lime was high. The evidence seemed to point to a continent in the making rather than to a sunken continent.—The varying form of the stomach in man and the anthropoid ape: Prof. D. J. **Cunningham**. The paper was a detailed discussion of the anatomy of the stomach, its changes of form and position at various stages of digestion, the functions of the different parts, and the movements by which digestion was carried out.—The evaporation of musk and other substances: John **Aitken**. The question was as to the nature of the exhalation or emanation which produced the characteristic odour; was it solid or vapour? The test applied was the cloud-producing power in a region saturated with water vapour and suddenly cooled. Experiment showed that when the air was purified of dust particles, but full of musk emanations and water vapour, a sudden cooling produced no cloud. Therefore the emanation must itself be vapour and not solid. The same result was obtained with many other substances, such as spices, chemicals, herbs, and flowers, not one of them giving off solid particles. Evidence was adduced that the dusts of these substances affected the branch of the fifth nerve which serves the nostrils, while the olfactory nerve was sensitive to matter in the gaseous form.

July 17.—Lord McLaren in the chair.—On some points in the geometry of reflecting telescopes with graphical solutions: Dr. James **Hunter**. The real problem in the construction of an efficient reflecting telescope is to find the best size of small mirror and the best position for it, so that the maximum of light and of definition is gained. This the paper discussed in detail, and gave a simple graphical construction by which the required data could be obtained to an approximation sufficient for practical purposes.—Some general principles of absorption spectrophotometry, and a new instrument: James R. **Milne**. The necessary conditions for the photometric comparison of two patches of light, of which one is produced by a ray passing through an absorbing medium, were fulfilled as follows:—(1) By use of a small hole instead of a slit in the collimator a strictly parallel beam of light was secured. (2) By use of a naked flat acetylene flame, the beam was obtained of equal intensity across a normal section, a condition unrealisable by electric arc or lime-light unless heavily screened. (3) By means of a double image prism replacing the ordinary eye-piece of the spectrophotometer telescope it was found possible (a) to bring the two patches of light presented to the eye accurately edge to edge, (b) to have these patches of some width, namely, that of the telescope objective, (c) to secure the coplanarity of the two "faces" of rays which proceed from each point of the edge common to the two patches. The instrument constructed on these lines could also be used as a spectrometer or as a spectropolarimeter for measuring optical rotations.—Note on some generally accepted views regarding vision: Dr. W. **Peddie**. The note referred to some observations on the effect of fatigue in the eye in relation to its power of judging of colour.—On the opacity of aluminium foil to the ions from a flame: George A. **Carse**. The experiments were made in the Cavendish Laboratory, and showed that the aluminium foil was quite opaque to the ions, a result not in agreement with results described by Lebon.—On deep sea-water waves: Lord **Kelvin**. This was a continuation of a paper read last January. By use of Lord Rayleigh's method of

ultimate intersections, a correct diagram was obtained of ship waves in deep and broad water, an approximate representation of which had been given in 1887 (see "Popular Lectures and Addresses," vol. iii.). The numerical calculations and drawings were made by Mr. J. de Graaff Hurster.—On the periods and nodes of Lochs Earn and Trieg: Prof. **Chrystal** and E. MacLagan **Wedderburn**. This was a detailed comparison of the observed periods and nodes with those calculated from the hydrodynamical theory as already given by Prof. Chrystal. The bottom contours were approximated to by piecing together appropriate parabolic functions of the depth; the results of theory and of observation were in good agreement, especially as regards the periods, which are less influenced by local conditions than the node-positions or the amplitudes.—A regular fortnightly exploration of the plankton of the two Icelandic lakes, Thingvallavatn and Myvatn: C. N. **Ostenfeld** and Dr. C. **Wesenberg-Lund**.—Note on the boiling points of solutions: S. N. **Johnson**. It was found that the boiling-point elevation constant C , as calculated from the formula

$$Cw\{1 + (n-1)\alpha\} = mWe,$$

where m is the molecular weight of salt used, W the weight of solvent, w the weight of salt added, α the ionisation constant, n the number of free ions, and e the observed elevation of temperature, had widely differing values. The discrepancies clearly arose from the difficulty of getting the boiling point of the solvent. When, however, C was calculated from the formula when for e and w are substituted the increments Δe and Δw , as one passes from solution of lower to solution of higher concentration, satisfactorily concordant results were obtained. The salts studied were the nitrate, chlorate, chloride, and bromide of potassium, and the nitrate and chloride of sodium.—The oxidation of manganese by persulphates: Dr. Hugh **Marshall**.—Influence of cross magnetisation on the relation between resistance and magnetisation in nickel: Dr. C. G. **Knott**. The decrease of resistance of a strip of nickel foil when magnetised transversely to its length was numerically increased when the foil was set in a steady magnetic field magnetising it longitudinally, while the increase of resistance accompanying the application of this longitudinal field was numerically decreased when the foil was set in a steady field magnetising it transversely.

PARIS.

Academy of Sciences, August 7.—M. Bouquet de la Grye in the chair.—Observations of the planet Y.R. (Goertz) made with the large equatorial of the Observatory of Bordeaux: E. **Esclangon**. Observations of this planet were made on July 29 and 30, and the results are given, together with the mean positions of the comparison stars, and the apparent positions of the planet.—On the sidereal day: A. **Pansiot**.—On continued algebraic fractions: M. **Auric**.—On similitude in the motion of fluids: M. **Jouguet**.—On the state of matter in the neighbourhood of the critical point: C. **Raveau**. A criticism on a recent paper on the same subject by MM. G. Bertrand and J. Lecarme. The author contests the views put forward by these authors, and notes that a consequence that they have deduced is a peculiarity of which a complete account is rendered by the ordinary kinetic theory of gases.—On magnetic double refraction. Some new active liquids: A. **Cotton** and H. **Mouton**. A solution of dialysed iron prepared by the method of Bravais undergoes a marked change when heated for some time at 100° C. The double refraction in a magnetic field became greater, four hours' heating making the double refraction forty times its original value; the size of the particles was clearly increased by the heating. Colloidal solutions of iron were also prepared by the method indicated by Bredig for the precious metals. This solution was doubly refracting also, but the variation with the strength of the field followed a different law to the Bravais solution. A solution of iron prepared by the Bredig method in glycerine was also examined. Solutions were also found exhibiting magnetic double refraction which did not contain iron, but minute crystals of calcium carbonate. Reason is shown for supposing that for these effects to be observed the size of the separated particles must lie between certain limits.—On the chloroborates of calcium: L. **Ouvrard**.—Study of the

constitution of unsymmetrical dipara-ditolyethane, of the dihydride of 2:7:9:10-tetramethylanthracene and of 2:7-dimethylanthracene: James **Lavaux**.—On the absorption spectrum of manganous salts: P. **Lambert**. The manganese salts used in the research were purified with especial care from iron, since the spectrum of the latter element in the ultra-violet was found to interfere. A diagram is given of the manganese bands for wave-lengths between 557 and 394.—The thermochemistry of the hydrazones: Ph. **Landrieu**. The reaction between some ketones and aldehydes has been determined directly in the calorimeter, and the values thus found compared with those deduced from the heats of combustion determined with the Berthelot bomb. The results of the two methods show a fair agreement.—The mechanical properties of iron in isolated crystals: F. **Osmond** and Ch. **Frémont**. The experiments were made upon crystals of a volume of several cubic centimetres, and included measurements of the extension, compression, hardness, and bending. It was found that the mechanical properties of iron in crystals are a function of the crystallographic orientation. The fragility, very great in the plane of cleavage, is, contrary to the views generally held, associated with great plasticity in the other directions.—The classification and nomenclature of the arable earths according to their mineralogical constitution: H. **Lagatu**.—On the reddening of the vine leaf: L. **Ravaz** and L. **Roos**. A study has been made from the chemical standpoint of the non-parasitic reddening of the leaf of the vine. The results confirm the theories of Boehm and some other authors on the solution and migration of the carbohydrates in the leaf.—*Sterigmato-cystis nigra* and oxalic acid: P. G. **Charpentier**. Oxalic acid is a product of the growth of this mould when cultivated in Raulin's solution, and is still produced when the tartaric acid of this solution is replaced by sulphuric acid. But if the Raulin's solution is deprived of sugar, and the tartaric acid is the only source of carbon, then oxalic acid is not formed.—On the mending of wounds in cartilage both from the experimental and histological points of view: V. **Cornil** and Paul **Coudray**.—On accommodation and convergence in binocular vision: Léon **Pigeon**.—The geological structure of the central Sahara: Émile **Haug**.

CONTENTS.

	PAGE
The Mathematics of Naval Strategy and Tactics.	
By Sir W. H. White, K.C.B., F.R.S.	361
The Correspondence of Huygens. By J. L. E. D.	362
Psychiatry	363
Our Book Shelf:—	
Osterhout: "Experiments with Plants"	364
Ostwald: "Conversations on Chemistry."—A. S.	364
Ball: "Mathematical Recreations and Essays"	364
Letters to the Editor:—	
The Rate of Formation of Radium.—Hon. R. J. Strutt, F.R.S.	365
The Effect of Radium on the Strength of Threads.—Hilda P. Martin and Prof. W. B. Morton	365
American Research in Asia. (Illustrated.) By Prof. Grenville A. J. Cole	366
Habits of Birds. (Illustrated.) By R. L.	367
The South African Meeting of the British Association	368
Inaugural Address by Prof. G. H. Darwin, M.A., LL.D., Ph.D., F.R.S., President of the Association. Part I.	368
Section A.—Mathematics and Physics.—Opening Address by Prof. A. R. Forsyth, Sc.D., LL.D., Math.D., F.R.S., President of the Section	372
Section B.—Chemistry.—Opening Address by G. T. Beilby, President of the Section. (Illustrated.)	378
Notes	384
Our Astronomical Column:—	
The Planet Mars	388
The Rings of Saturn	388
Declinations of Certain North Polar Stars	388
The Minor Planet Oclo (475)	388
The Royal University Observatory of Vienna	388
The State and the Clayworker	388
The Cerebellum: its Relation to Spatial Orientation and Locomotion. By Sir Victor Horsley, F.R.S.	389
University and Educational Intelligence	390
Societies and Academies	391